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MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—A contribution to the knowledge of the geology of South America has recently been made by Bergt[2] through the study of thin sections of rocks collected in the Sierra Nevada and the Sierra de Peryá in the United States of Columbia. Bergt has confined himself to a description of a large number of rocks that were collected by others, and therefore he has not been able to do more than indicate the interesting results which follow from a close study of their thin sections. Among the facts of general interest discovered may be mentioned the formation of secondary epidote from augite and olivine in melaphyre, and the production of an epidosite therefrom; the occurrence of lamellæ in uralite of syenite, that have became curved through the pressure exerted upon them by a feldspar crystal during its growth; the existence of a rim of brown hornblende around a grain of uralite, and the occurrence of secondary brown mica as a product of the alteration of augite. The writer also discusses the nature of uralite, and suggests that the name uralitite be used as a comprehensive one for those rocks containing secondary hornblende, whose original nature cannot be determined.——Goller[3] describes in a very careful article a number of lamprophyre dykes cutting gneiss and crystalline schists in the Vorspessart in Germany. The crystalline schists consist of dioritic and "augen" gneisses, produced by pressure from eruptive rocks, and other gneisses, the history of whose origin is unknown. They are cut by dykes of camptonite and kersantite, whose characteristics are minutely described by the author. Both contain large quartz and orthoclase grains that are supposed to be the remnants of dissolved inclusions, and smaller quartzes that have crystallized from the magma. Two varieties of augite were observed; one alters into talc and tremolite through green hornblende, and the other into serpentine through the same intermediate product. The original quartz is supposed to owe its origin to the physical conditions prevailing during the solidification of the rock mass—principally pressure and the presence of water.——Still other instances of the occurrence of young rocks with the characteristics of old ones are described by Reiser[4] from four localities in the northern Alps. They are typical diabases and diabase porphyrites of Eocene age. They consist of plagioclase, augite, apatite and secondary substances, and occur with the typical structure of granular and aphanitic diabases. They are characterized by the zeolitization of the plagioclase. Among the zeolites formed are natrolite and analcite, of which the latter has been separated and identified by chemical means.——Thin veins of diabase with tachylite borders have produced fusion along the edges of the slates through which they cut. According to Rutley[5] the glassy rim produced by the fusion is darker in color than the tachylite selvages of the dyke rock.——N. H. and H. V. Winchell[6] propose a new theory for the origin of the iron ores of Minnesota, in opposition to the iron carbonate theory[7] of Irving. The new theory follows the same lines as does Hunt's crenitic hypothesis. It is based entirely on theoretical suppositions, which, so far as is known, can have little foundation in facts.

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] *Min. u. Petrog Mitth.*, 1889, X., p. 271.

[3] *Neues. Jahrb. f. Min.*, etc., B. B. VI., p. 485.

[4] *Min. u. Petrog. Mitth.*, X., 1889 p. 500.

Mineralogical News.—*Rare Minerals.*—In an article on the minerals of Fiskernäs, in Greenland, Ussing[8] has given the crystallographic and optical properties of several rare minerals. *Sapphirine* has for its axial ratio $a : b : c = .65 : 1 : .93$. $\beta = 79° 30'$. The axis of least elasticity is inclined 8° 30′ to the vertical axis, and $2V_{na} = 68° 49'$. The indices of refraction are $\alpha = 1.7055$, $\beta = 1.7088$, $\gamma = 1.7112$. The mineral is negative, and is pleochroic with A colorless, and B and $C =$ blue, or $A =$ light greenish blue, $B =$ dark bluish green, and $C =$ yellowish sap green. An analysis of the mineral yielded:

SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	Loss
12.83	65.29	.93	.65	19.78	.31

Kornerupine is orthorhombic with $a : b = .854 : 1$. It has a specific gravity of 3.273, is colorless in thin section, and has $\infty P \bar{\infty}$ as the plane of its optical axes, with c the acute bisectrix, which is negative. The optical properties of *gedrite* and *pargasite* are also investigated. In a few general remarks on the properties of the former mineral the author states that it is more probable that the optical angle of the orthorhombic hornblendes increases with the increase in the percentage of silica rather than with the increase of iron.——*Atelesite,* analyzed by Busz,[9] yielded:

As_2O_5	Bi_2O_3	Fe_2O_3	H_2O
14.12	82.41	.51	1.92

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[5] *Quart. Jour. Geol. Soc.*, 1889, p. 626.

[6] *American Geologist*, Nov. 1889, p. 291.

[7] AMERICAN NATURALIST, Dec., 1886, p. 1050.

[8] *Zeits. f. Kryst.*, 1889, XV., p. 596.

[9] *Zeits. f. Kryst.*, 1889, XV., p. 625.

The axial ratio, recalculated from von Rath's measurement, is $a : b : c =$ .9297 : 1 : 1.5123. $\beta = 69° 35'$. New measurements by Busz gave $a : b : c =$ .9334 : 1 : 1.5051. $\beta = 70° 43'$.——*Kobellite*, from the Silver Bell Mine, Ouray, Colorado, has been analyzed by Kellar.[10] Its composition is:

S	Bi	Sb	Pb	Ag	Cu	Fe	Zn	Gangue
18.39	28.40	7.55	36.16	3.31	2.59	1.50	.39	.45,

which may be represented by $2(Pb.Ag_2Cu_2)\ S.(BiSb)_2S_3$. It differs in composition from the mineral called kobellite by Rammelsberg (Pb_3BiSb_6), but is like that to which the name was first given by Selterberg. The same author suggests the name *lillianite* for a substance of the composition $3(PbAg_2)\ Bi_2S_3$ described by himself[11] several years ago.——*Nivenite* is a rare mineral associated with fergusonite and gummite at the gadolinite locality in Llano County, Texas. It is described by Genth[12] as velvety black, with a brownish streak. It is easily soluble in nitric acid, and possesses the composition:

UO_3	UO	ThO_2	Y_2O_3, etc.	Fe_2O_3	PbO	Ign	Ins	Sp Gr
46.75	19.89	7.57	11.22	.58	10.16	2.54	1.22	8.01

It is allied to bröggerite ($3RO.UO_3$) and clevéite ($6RO.2UO_3.3H_2O$) in containing a large proportion of uranium. Its hardness is 5.5, and its composition is represented by ($9RO.4UO_3.3H_2O$). Two varieties of *fergusonite* have been found in the same locality. The first corresponds to $Cb_2O_5.R_2O_3.H_2O$, and the second to $Cb_2O_5.R_2O_3.3H_2O$. The two are closely associated. The first is probably tetragonal, with a bronzy lustre on a fresh fracture. It is infusible, decrepitates when heated, and changes to an olive green color. The second variety is deep brown in color. Its streak is greenish gray. Upon ignition it turns light brown but does not decrepitate.——*Hydrocerussite* ($2PbO_3 + Pb(OH_2)$, corresponding to azurite among the copper salts, has been produced by Bourgeois,[13] by acting upon lead acetate with ammonium carbonate. The little crystals thus formed have all the properties of the natural substance. By means of them the composition of the mineral has been determined. The white lead of commerce is found by the author to be a mixture of two substances with the composition respectively of cerussite and hydrocerussite.——*Percylite* and *caracolite* are briefly mentioned by Fletcher[14] as among the many lead salts produced by the decomposition of bournonite and galena at the Mina Beatriz, Sierra Gorda, Chili.

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[10] *Zeits. f. Kryst.*, 1889, XVII., p. 67.

[11] *Jour. Amer. Chem. Soc.*, Vol. VII., No. 7.

[12] *Amer. Jour. Sci.*, Dec. 1889, p. 474.

[13] *Bull. Soc. Franc. d. Min.*, XI., p. 221.

[14] *Min. Magazine*, 1889, p. 171.

Miscellaneous.—Pseudomorphs of talc after quartz, magnesite and calamine are found not uncommonly in a talc layer at Göpfersgrün, near Wunsiedel in the Fichtelgebirge, near a contact of granite and limestone, that has suffered dolomitization as the result of the action of magnesian solutions emanating from the eruptive rock. The genesis and growth of the talc pseudomorph after quartz are carefully described by Weinschenck[15] as taking place in the following manner. The quartz crystals are first traversed by numerous capillary cracks, running parallel to the prismatic faces and rarely parallel to the rhombohedral planes. Along the sides of these, little plates of talc are developed. From certain points within the crystal other fissures then begin to form, and along the sides of these more talc is formed, until finally there remain only a few isolated areas in which the original mineral can be detected. The production of the new mineral along the cracks leads to the supposition that the change is due entirely to the medium of circulating water, a view that is substantiated by experimental researches.——An important contribution to the discussion of optical anomalies has been made by Erb[16] in a study of sodium acetates of copper, magnesium, nickel, and other metals. When allowed to crystallize slowly these salts form at first uniaxial crystals belonging to the hexagonal system. As they increase in size the crystals become twinned according to certain orthorhombic laws. In thin section they show twinning lamellæ, which disappear when the temperature is raised to 65°. The etched figures produced in both the simple and twinned crystals are of the same shape. They lie in the same relative positions, and are not symmetrically developed about the twinning planes of the lamellæ, but they have the symmetry belonging to the hexagonal system. The twinned crystals are pyroelectric, but upon assuming the isotropic condition they lose this property entirely. To account for these anomalies the author thinks that a strain has been superinduced in them during their growth. If they are mimetitic forms it is odd that the crystals should possess a certain grade of symmetry when small, and assume it again when heated.——Upon treating freshly precipitated ferric hydroxide at 250° with water, to which a trace of ammonium fluoride has been added, Bruhns[17] obtained little plates of *hematite* with hexagonal cross sections. Freshly precipitated alumina when treated in the same way at 300°, yielded little crystals of *corundum* with pyramidal terminations. *Quartz* crystals with rhombohedral terminations were produced by heating pulverized glass or amorphous silica to 300° under the same conditions. Microcline gave *tridymite* plates. A mixture of metallic iron, iron oxide and amorphous silica produced litte black amorphous plates of *ilmenite* and crystals of *magnetite.* The syntheses are of importance as indicating the possibility of the formation of contact minerals at a low temperature in the presence of traces of fluorine.——Johnston[18] has subjected muscovite and biotite to the action of pure water and to that of dilute carbonic acid for the length of one year. The *muscovite* undergoes no change in this time except slight hydration, in consequence of which it becomes a hydro-muscovite resembling margarodite in composition. Biotite during this time becomes bleached under the influence of the carbonic acid. It loses some of its magnesium and iron, assumes water, and passes like the muscovite into a hydromuscovite. Anhydrous micas when they undergo hydration increase in bulk, a fact that may help to explain the cause of the rapid weathening of micaceous sandstones.——Bruhns[19] has succeeded in obtaining genuine *glass inclusions* in quartz by heating in a bath of molten granite specimens of phrase and pieces of quartz containing inclusions of fibrolite. The resulting glass is entirely surrounded by quartz, and is not merely a portion of the granitic substance filling cracks produced in the mineral by heating. The inclusions are arranged in straight and curved lines, and have all the properties of inclusions found in porphyritic quartzes.——A brief comparison of the shapes of the etched figures in diopside and spodumene is made by Greim[20]. The depressions found on the ∞ P faces of the first mineral are nearly triangular, with their apices inclined toward the positive hemi-pyramid.——Mr. Lane[21] describes a method of determining the values of the optical angles of minerals in thin sections of rocks without the use of converged light.

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[15] *Zeits. f. Kryst.*, XIV., p. 305.

[16] *Neues Jahrb. f. Min.* etc., B. B. VI., p. 121.

[17] *Neues. Jahrb. f. Min., etc.*, 1889, II., p. 62.

[18] *Quart. Jour. Geol. Soc.*, May, 1889, p. 363.

[19] *Neues. Jahrb. f. Min., etc.*, 1889, I., p. 268.

[20] *Miner. Magazine*, May, 1889, p. 252.

[21] *Amer. Jour. Sci.*, Jan., 1890, p. 53.